

**Abstract:**

Ag is the best plasmonic metal. This makes it valuable for applications ranging from chemical and disease detection to Raman-scattering spectroscopy<sup>[1,2]</sup>. However, Ag's applications are limited because of its tendency to tarnish by oxidation and sulfidation<sup>[3]</sup>. By contacting Ag with Co, much higher stability can be obtained. These Ag-Co nanoparticle arrays show little change in the wavelength location of the localized surface plasmon resonance or sensitivity in changes to refractive index even after being exposed to high temperature and humidity or being aged for significant duration because of the higher stability against oxidation.